Field Calculations: Creating Random Values

ArcGIS 10.4+

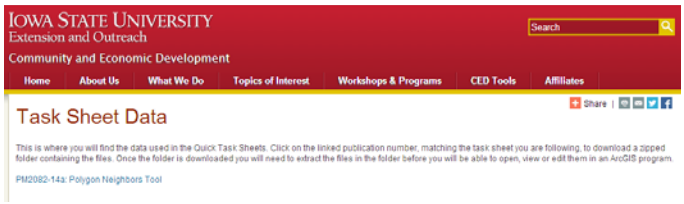
Welcome to the Essential ArcGIS Task Sheet Series. This series supplements the Iowa State University GIS Geospatial Technology Training Program short course series, "Essential ArcGIS Tutorial Series." The task sheets are designed to provide quick, easy instructions for performing specific tasks in GIS.

Random values may be needed in an attribute table in order to analyzing specific scenarios. In ArcMap you can create random values using the field calculator and Python code. This task sheet will take you through those steps and demonstrate creating random integer values and random decimal values using Python in the field calculator.

1. Download the Data

a. To download the data used in this task sheet, navigate to www.extension.iastate.edu/communities/gis/quicktasksheets/data in a web browser. Click on the publication number: **PM2082-16k**.

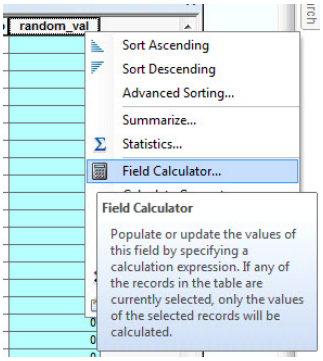
b. When the download is complete, you will need to unzip the folder in order to access the files in ArcGIS. The folder contains a shapefile of the counties in Iowa.

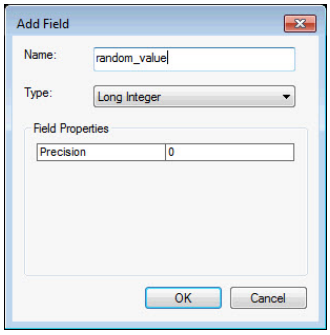


2. Calculate Random Numbers 0 - 100

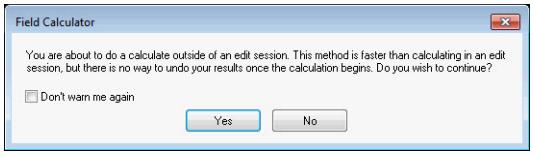
a. Open the attribute table for the **county** shapefile.

b. Click on the **Table Options** icon in the top left corner of the attribute table, and select **Add Field**. In the **Name** text box, type in **random_value** In the **Type** drop-down select **Long Integer** or **Short Integer**. Leave the default **Precision** and click **OK**. *Note: the random_value field name contains too many characters and will be shortened to random_val, unless your file is in a geodatabase.*



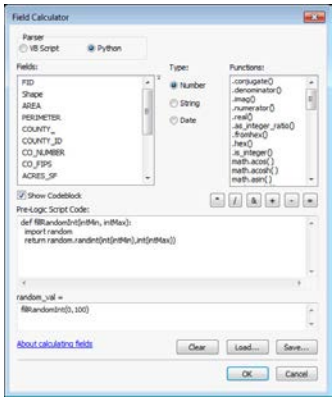


c. Select the **random_val** field so it becomes highlighted, right-click, then select **Field Calculator**. If you get a warning message about calculating outside of an edit session, select **Yes** to continue.



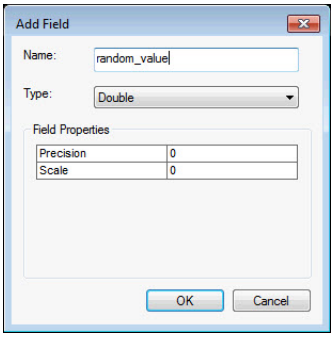
d. In the **Field Calculator** select **Python** as the **Parser** and check **Show Codeblock**. In the **Pre-Logic Script Code** section type in:

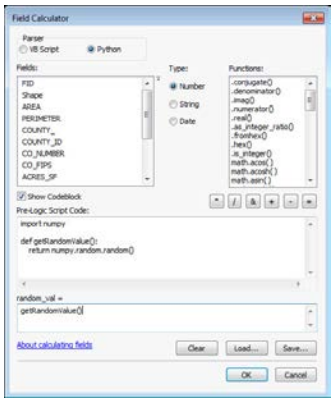
```
def fillRandomInt(intMin, intMax):
    import random
    return random.randint(int(intMin),int(intMax))
```



e. Set **random_val =** to the function **fillRandomInt(0,100)** and click **OK**. *Note: change the numbers 0 and 100 to change the range of random numbers calculated. The calculated values will be integers and will not have decimals.*

3. Calculate Random Numbers 0.0 - 1.0





a. Open the attribute table for the **county** shapefile.

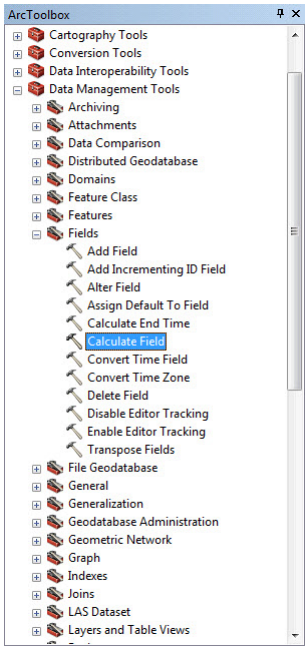
b. Click on the **Table Options** icon in the top left corner of the attribute table, and select **Add Field**. In the **Name** text box, type in **random_value** In the **Type** drop-down select **Double**. Leave the default **Precision** and **Scale** and click **OK**. *Note: the random_value field name contains too many characters and will be shortened.*

c. In the **Field Calculator** select **Python** as the **Parser** and check **Show Codeblock**. In the **Pre-Logic Script Code** section type in:

```
import numpy
def getRandomValue():
    return numpy.random.random()
```

d. In the expression, set **random_val =** to the function **getRandomValue()** and click **OK**. *Note: if your field type is set to long integer or short integer, you will only see random zeros and ones. If your field type is set to float or double you will see random numbers with decimals.*

4. Calculate Random Numbers Using the Field Calculator Tool in ArcToolbox



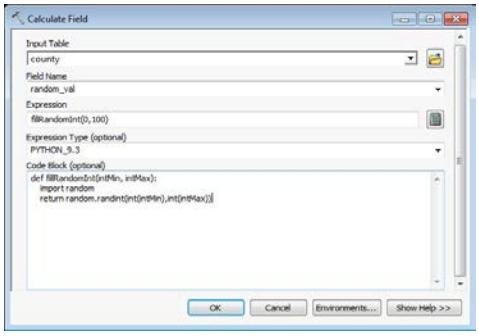
a. Open **ArcToolbox** and select **Data Management Tools > Fields > Calculate Field**.

b. In the **Calculate Field** tool select **county** as the **Input Table** and **random_val** as the **Field Name**. Click on the expression calculator, the same window that you saw in **step 2d** and **step 3c** will appear.

c. Fill in the code from **steps 2d and 2c** or **steps 3c and 3d** and Click **OK**.

d. Select **PYTHON_9.3** as the **Expression Type**, and click **OK**.

e. The tool will run and give you a geoprocessing result message indicating when the calculation is complete.



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